

TOTAL CONTROL

Siemens' Simatic IT system takes factory automation to the next level.

By David Williams

As the tobacco industry searches for ways to optimize operations, it relies increasingly on computers. Automation can eliminate excess usage of materials, increase efficiency and eliminate manual operations that are slower and less accurate.

But in many of these endeavors, companies are not looking to automate every corner of their business. They seek a more finite answer, a more detailed solution to a specific challenge. The response of the IT world was the MES—the manufacturing execution system, which uses computers to improve efficiency in manufacturing environments.



At Siemens, the automation giant, the answer to questions like this was thought of long ago—and it is being refined to meet growing, changing challenges. Siemens' Simatic IT provides detailed data that can determine where a product's components came from. It can also serve as an authentication system for shipments from a factory, providing a valuable aid to anti-counterfeiting efforts. But those functions only scratch the surface of what this system can do.

"Because it can interface to an ERP [enterprise resource planning] system, it can process production orders, control material versioning and the bill of materials, which can be directly downloaded," said Colin Gray, Siemens tobacco industry manager.

"It will then match those orders to the material requirements and link the orders to the areas of the plant in which these orders should be run and can access specific order-related

control parameters that can be sent down to the lower control system. The production orders are simply scheduled and executed at the plant level. The system can then perform the verification of the required materials and thus ensure product integrity."

Gray went on to say that since the system can verify the products consumed against each order, it not only tracks and traces the products consumed within an order but also generates a true genealogy of the final product. A company can track backward from a final product to the individual barcodes of each material consumed, thus identifying where the materials came from across the plant locations, and back along the supply chain.

Gray said this track-and-trace technology would enable a company that had to answer to a governmental sanctioning body to show data on what materials were used in the final product and at what levels. It could indicate where the materials came from and where each material was created or consumed within the plant.

In addition, Simatic IT can identify the source of a product from its final destination. "If you have bar coding on a box or on a carton, you would be able to track from which factory that carton came from," Gray said. "That then takes on a more globalized tracking and tracing platform that becomes very important in fighting counterfeiting. In this respect the ERP system may hold the centralized data, but Simatic IT would perform the tracking of the individual carton barcodes within the factory, in which final case they were added, and onto which shipment pallet they were placed. If this functionality is tied to the genealogy and tracking and tracing elements of Simatic IT at the plant level, the end result is a very powerful tool."

Smooth operator

Simatic IT has an important advantage in that it follows criteria laid out by the computing and manufacturing industry to enable systems to operate smoothly and integrate into existing systems.

The heart of Simatic IT lies in its production modeler, one of the core programs in this suite of programs. The production modeler takes the data from the factory floor in real time, diagrams each step of the process through virtual simulation and responds with adjustments to the systems it controls; the suite can be used to predictively schedule production orders against the materials needed and determine what portion of the factory should handle the order.

In conjunction with the production modeler is a library of industry specific solutions, developed by Siemens, that can be used to detail responses to generic plant operations to the last detail, based from real-time data. Siemens can maintain and update these software libraries, ensuring that they are current and reliable.

"The system is very comprehensive in the fact that it reaches into nearly everything you would want to do within a factory—production orders, historical data, material verification, downtime analysis, waste tracking, quality ... and can report all this available data back to the user in a contextualized format," Gray said.

The tobacco-specific customer base is impressive. Since its introduction to the tobacco industry some years ago, JTI, Philip Morris, BAT, China Tobacco and Shanghai Tobacco, among others, have installed either the entire suite or portions of Simatic IT. In some cases, companies install parts of the system to meet their current demand. The system can then be enhanced at a later date to include further functionality as required.

"You can break [the system] into smaller pieces," Gray said. "A customer may want a full-blown MES system or just OEE analysis of equipment downtime; you may start off with tracking and tracing, then move on to true material verification, waste reporting and even to linking the system to the laboratory on site for material quality verification and KPI trimming."

Case studies

The 2004 merger between R.J. Reynolds Tobacco and Brown & Williamson left its successor company, Reynolds American, with a diverse product portfolio and support systems that were outdated and limited in their expansion ability. In addition, a system was needed that managed the details of each of the products' specific needs—something that would work with their ERP implementation and other systems that supported the existing product lines.

The company also needed a specifications management system that could be more versatile and would simplify the processes needed to manage and maintain those specifications. In addition, Reynolds was in the process of implementing a new enterprise resource system, SAP, which had to work with the new management system. The new systems were being implemented on a tight timetable.

Using the bundled Simatic IT systems enabled Reynolds to provide the interaction with SAP needed to optimize both systems and make them work together. The Simatic IT gave the company flexibility in the approval process. In addition, Simatic

IT eliminated the need for manual data entry into more than one system, which moved products to market faster.

As a result, Reynolds runs both SAP and Simatic IT. All product specifications for product lines are managed through the program, with changes to specifications implemented in record time, and time in market for new products is sharply increased. This system is being further enhanced with the inclusion of the plant layer control system into the Simatic IT platform.

In northern China, Qingdao felt the need to reduce manufacturing costs and standardize manufacturing operations at its plant. A reliable, flexible MES program would enable streamlining of all areas of operations and ease decisionmaking across all levels of the company.

Qingdao wanted a digital plant, run on the concept of collaborative manufacturing, which puts all plant operations into real time and carefully directs workflow. Under this concept, there are 11 subsystems, creating an environment that can easily stall under the dynamic of so many systems operating all at once. The IT design of each subsystem had limited connectivity with the others. The company needed an MES system to unite the disparate parts of the overall operation.

Simatic IT allowed all of the company's subsystems to run on a single platform under a common language. The factory managers were able to get the next production step in the process and monitor all key performance indicators. Simatic IT created a tight interaction with the company's ERP, which drastically improved the plant's efficiency.

The time spent generating a production plan dropped from four hours to 10 minutes. Using a Simatic IT platform similar to the one used at Reynolds, releasing product process specification was accomplished in one minute, from four hours before. The streamlining of operations with Simatic IT workflow plans shortened production cycles by an hour. Standardized reports are available now that give data to track efficiency and productivity.

Simatic IT bridged the communication gaps in Qingdao's operation by finding data the company knew it needed but could not locate and created the data by combining data that used to come from dissimilar systems. The improvements not only saved time but also eliminated erroneous data that came from incorrect manual data entry.

User-friendliness

The future of Simatic IT, according to Gray, is in making it more user friendly.

"The older versions didn't look or feel like a Windows application," he said. "Siemens has made major inroads into changing that, along with a number of other product enhancements to improve speed and connectivity."

Gray sees Simatic IT branching out into new technologies, an improved portfolio of interfaces and integration to the plant and device level, he said. "Along with the continued product enhancements, there is also the increased off-the-shelf functionality from the library perspective."

The goal is the creation of a Siemens-backed system supported by libraries that target specific function areas of the industry, which ensures each solution has tested processes to back it up. Additional functions can then be added to meet specific requirements or preferences.

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